

FIG. 1

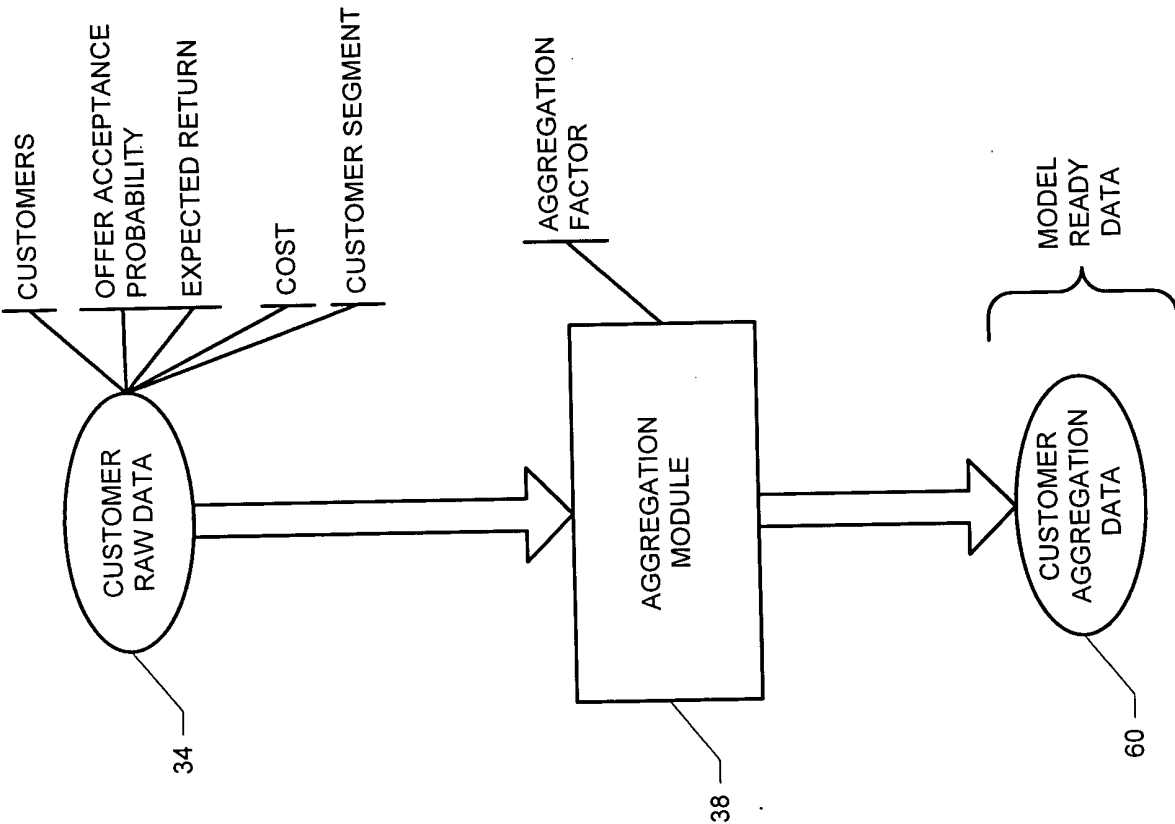
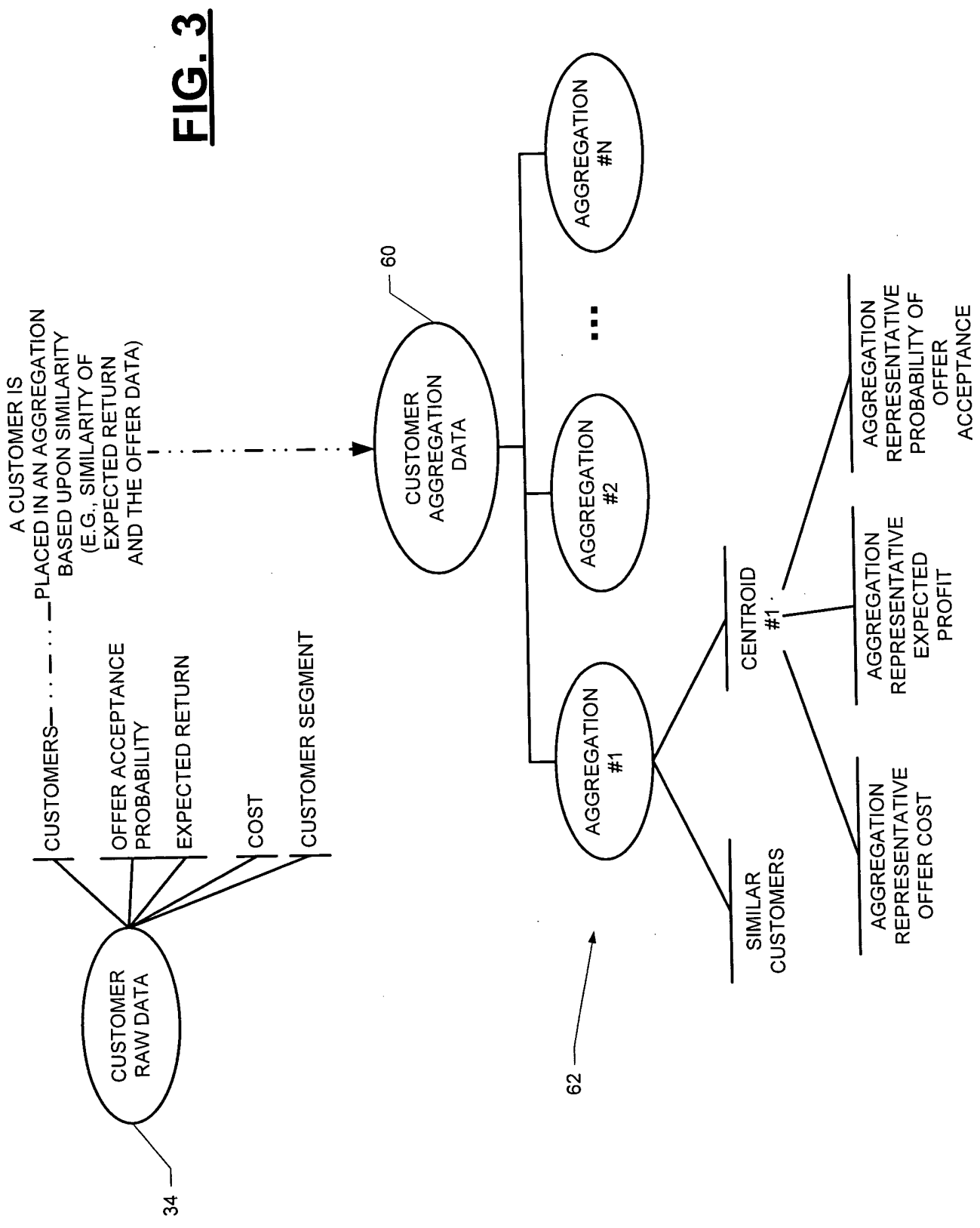


FIG. 2



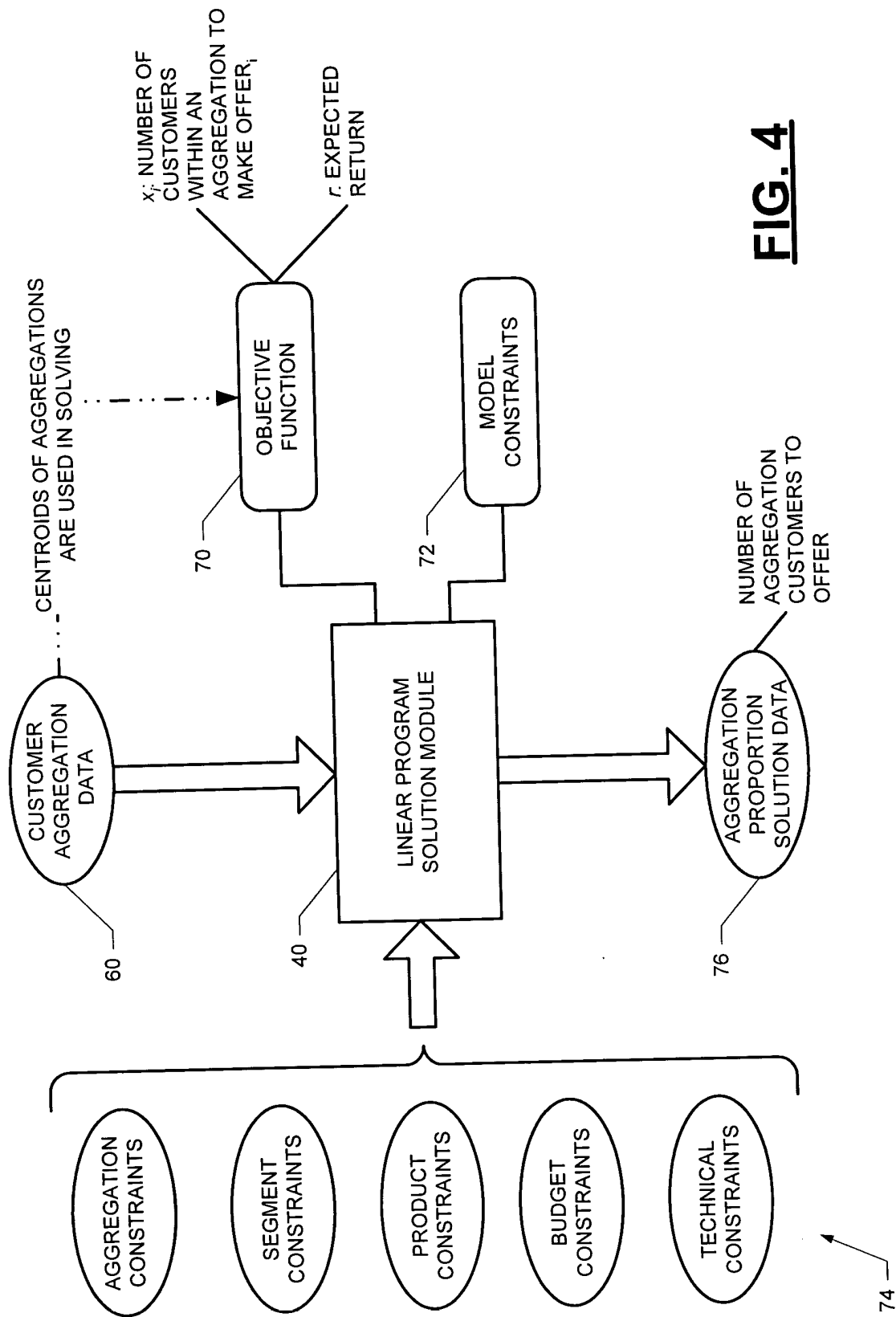


FIG. 4

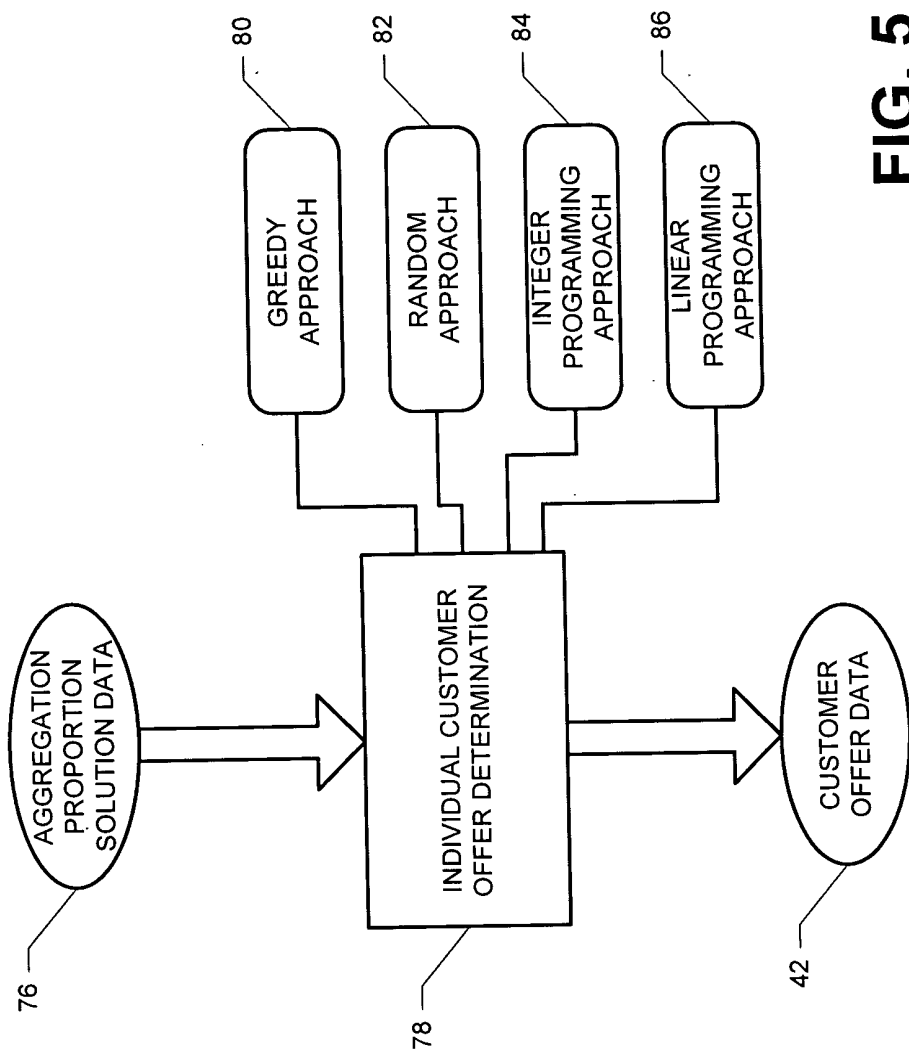


FIG. 5

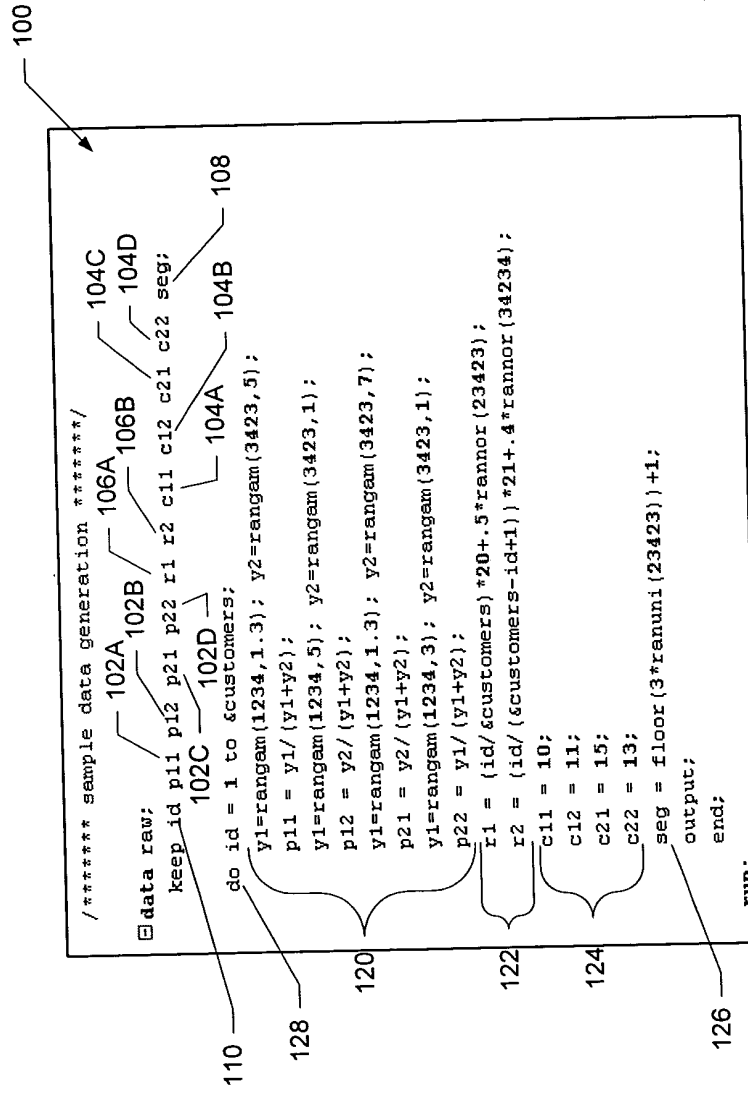


FIG. 6

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/***** clustering for problem reduction *****/

proc sort; by seg; run;
proc fastclus noprint out=raw outstat=stats
    maxclusters={clusters};
    by seg;
run;
data processed;
    drop _type_ cluster over_all;
    set stats;
    if _type_="CENTER";
run;
proc transpose data=processed out=processed;
    by seg;
run;
proc sort data=processed;
    by _name_ seg;
run;

data cluCap;
    set stats;
    keep k l t;
    if _type_="FREQ" then do;
        l=seg; k=cluster; t=over_all;
    output;
    end;
run;

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FIG. 7

254		256				258		260				262		264	
252		p11	p12	p21	p22	r1	r2	c11	c12	c21	c22	seg	CLUSTER	DISTANCE	
Obs	id														
1	1	0.11074	0.48555	0.94582	0.96554	0.00979	-0.35593	10	11	15	13	1	1	4.3573	
2	4	0.28563	0.07505	0.91038	0.59161	0.04645	-0.05492	10	11	15	13	1	1	1.3951	
3	11	0.13081	0.46158	0.98821	0.89247	0.62371	0.35517	10	11	15	13	1	1	5.6949	
4	13	0.16086	0.01494	0.98430	0.68928	0.21443	0.49636	10	11	15	13	1	1	7.6920	
5	17	0.09411	0.17567	0.99407	0.93942	0.22824	1.14134	10	11	15	13	1	8	6.2236	
6	18	0.03214	0.06940	0.91838	0.23360	0.89762	0.63615	10	11	15	13	1	8	5.2488	
7	19	0.16242	0.07873	0.78917	0.86001	0.13139	0.75792	10	11	15	13	1	8	4.2094	
8	22	0.13580	0.18837	0.67858	0.90570	-0.03109	0.57201	10	11	15	13	1	8	1.2847	
9	25	0.27089	0.15301	0.83321	0.99485	0.38978	0.59380	10	11	15	13	1	8	1.8256	
10	26	0.20278	0.10235	0.92948	0.96529	0.20560	0.65267	10	11	15	13	1	8	2.8129	
11	28	0.08616	0.14062	0.83299	0.55916	0.75843	0.95097	10	11	15	13	1	8	4.8323	
12	31	0.19679	0.17228	0.99119	0.72441	0.06016	-0.06216	10	11	15	13	1	8	7.8388	



FIG. 8


```

/* Initialization */
init;

/* Subscripts */
%subscript(i,ds=set1,var=i,descript=product);
%subscript(j,ds=setJ,var=j,descript=channel);
%subscript(k,ds=setK,var=k,descript=cluster);
%subscript(l,ds=setL,var=l,descript=segment);

/* Data */
%table(p,subs=ijkl,ds=probs,var=p);
%table(t,subs=ikl,ds=return,var=t);
%table(c,subs=ij,ds=cost,var=c);
%table(T,subs=kl,ds=clucap,var=T);
%table(S,subs=i,ds=segCap,var=S);
%table(V,subs=i,ds=prdCap,var=V);
%table(U,subs=ij,ds=cstCap,var=U);

/* Variable */
unknown(x,subs=ijkl);

/* Objective function */
%sigma(unknown*x(ijkl),coef=p(ijkl)*r(ikl),relation=max);

/* Cluster constraint */
%sigma(unknown*x(ijkl),coef=1,relation=le,rhs=T(kl),forall=kl);

/* Segment constraint */
%sigma(unknown*x(ijkl),coef=1,relation=ge,rhs=S(i),forall=i);

/* Product constraint */
%sigma(unknown*x(ijkl),coef=1,relation=ge,rhs=V(i),forall=i);

/* Budget constraint */
%sigma(unknown*x(ijkl),coef=c(ij),relation=le,rhs=W(ij),forall=ij);

/* Solve the problem */
solve(prntiv=1);

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FIG. 9

Obs	id	product	channel	return
801	946	2	1	306.79
802	950	2	1	372.51
803	951	2	1	338.25
804	955	2	2	324.64
805	958	2	1	443.37
806	961	2	2	455.81
807	987	2	1	1215.23
808	994	2	2	2391.07
809	995	2	2	3229.72
810	625	1	1	0.29
811	626	1	1	0.88
812	215	1	1	0.07
813	203	1	1	0.16
814	214	1	1	0.23
815	213	1	1	0.38
816	209	1	1	0.47
817	207	1	1	0.52
818	342	1	2	0.09
819	346	1	2	1.19
820	350	1	2	3.11
821	734	2	1	38.30
822	730	2	1	43.09
823	735	2	1	45.04
824	621	2	2	8.74
825	620	2	2	25.38
826	631	2	2	29.19
827	735	2	2	18.40
828	734	2	2	33.26
829	730	2	2	36.05
830	756	2	2	42.75
831	753	2	2	44.21
832	750	2	2	44.92
=====				115175.63

FIG. 10

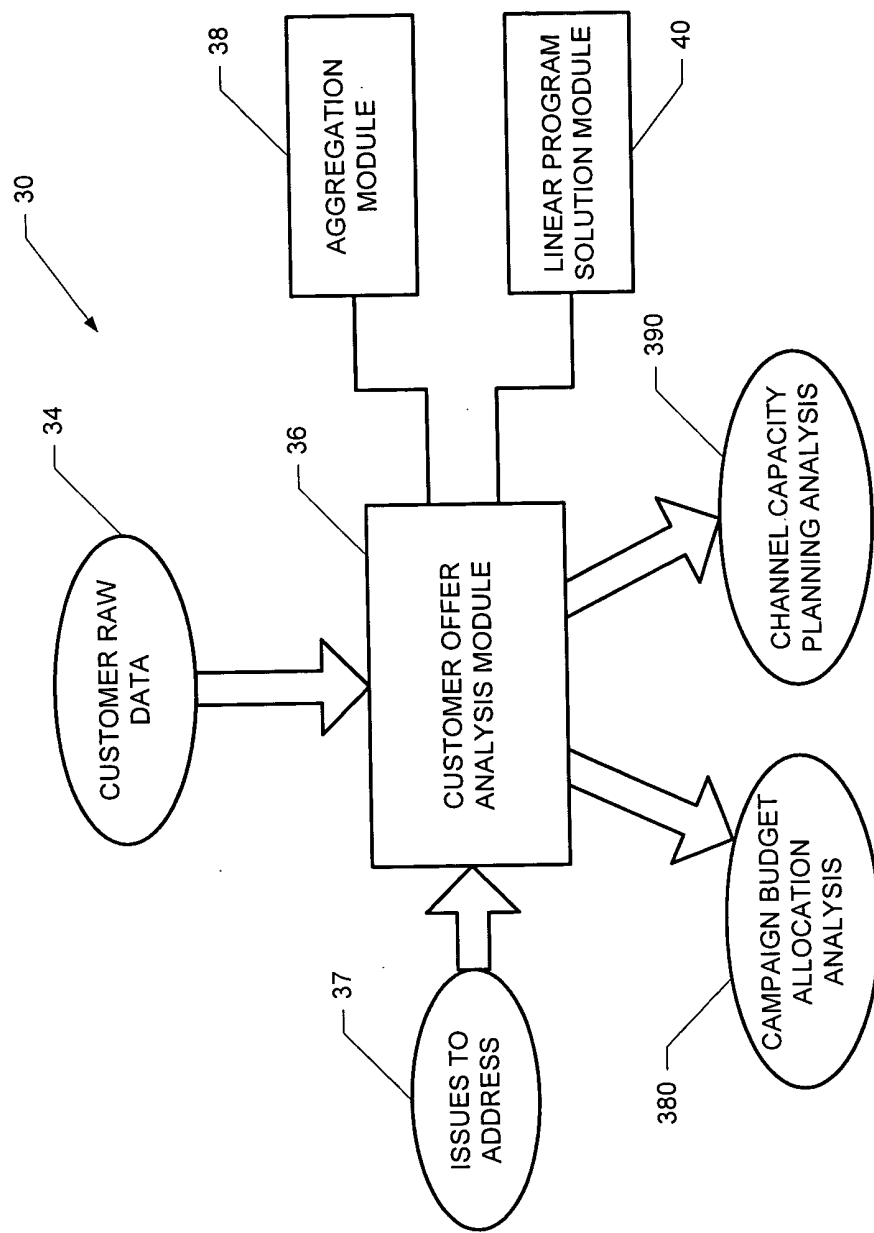


FIG. 11